Water-man, or other underſtanding Perſon, who dwells by the Water-ſide.

It would alſo deſerve (thinks he) to be inquired into, whether, when the Tides be higheſt, the Ebbs be ever loweſt, *& contra*; (which is generally affirmed, and almoſt put out of queſtion) or rather (which ſutes beſt with his *Hypotheſis*) whether, when the Tides are higheſt, both in the *Annual* and *Menſtrual* Periods, the Low waters be not alſo higheſt; and at Neap-Tides, the Ebbes alſo very low.

He adds, that he ſhould expect, that the Spring-Tides now coming, and thoſe at the beginning of *September*, ſhould not be ſo high, as thoſe at the *middle* of *September*; and then lower again at the *beginning* of *October*, and after that, higher at the *middle* of *October*, and higher yet about the *beginning* of *November* (at the uſual times of *Spring-tides* after the *New* and *Full*.)

Conſiderations and Enquiries concerning Tides, *by Sir* Robert Moray; *likewiſe for a further ſearch into Dr.* Wallis's *newly publiſh't* Hypotheſis.

In regard that the High and Low waters are obſerved to increaſe, and decreaſe regularly at ſeveral ſeaſons, according to the Moons age, ſo as, about the *New* and *Full Moon*, or within two or three daies after, in the Weſtern parts of *Europe*, the *Tides* are at the *higheſt*, and about the *Quarter-Moons*, at the *loweſt*, (the former call'd *Spring-tides*, the other *Neap-tides*;) and that according to the height and exceſſes of the *Tides*, the *Ebbes* in oppoſition are anſwerable to them, the heigheſt Tide having the loweſt Ebbe, and the loweſt Ebbe, the higheſt Tide; the Tides from the *Quarter* to the *higheſt Spring-tide* increaſing in a certain proportion; and from the *Spring-tide* to the *Quarter-tide* decreaſing in like proportion, as is ſuppoſed: And alſo the *Ebbes* riſing and falling conſtantly after the ſame manner: It is wiſhed, that it may be inquired, in what proportion theſe Increaſes and Decreaſes, Riſings and Fallings happen to be in regard of one another?

And 'tis ſuppoſed, upon ſome Obſervations, made in fit places, by the above-mentioned Gentleman, though, (as himſelf acknowledges) not thoroughly and exactly performed, that the Increaſe of the Tides is made in the *Proportion* of *Sines*; the firſt Increaſe exceeding the loweſt in a ſmall proportion; the next in a greater; the third greater than that; and ſo on to the mid-moſt, whereof the exceſs is greateſt, diminiſhing again from that, to the higheſt Spring-Tide; ſo as the proportions, before and after the *Middle*, do greatly anſwer one another, or ſeem to do ſo. And likewiſe, from the *higheſt Spring-tide*, to the *loweſt Neap-tide*, the *Decreaſes* ſeem to keep the like proportions; the *Ebbes* riſing and falling in like manner and in like proportions. All which is ſuppoſed to fall out, when no Wind or other Accident cauſes an alteration.

And

And whereas 'tis obſerved, that upon the main Sea-ſhore the Current of the Ebbings and Flowings is ſometimes ſwifter, and ſometimes ſlacker, than at others, ſo as in the beginning of the Floud the Tide moves faſter but in a ſmall degree, increaſing its ſwiftneſs conſtantly till towards the *Middle* of the Floud; and then decreaſing in velocity again from the *Middle* till to the top of the High-water; it is ſuppoſed, that in Equal ſpaces of Time, the Increaſe and Decreaſe of velocity, and conſequently the degrees of the Riſings and Fallings of the ſame, in Equal ſpaces of time, are performed according to the *Proportion* of *Sines*.

But 'tis withall conceived, that the ſaid *Proportion* cannot hold *exactly* and *preciſely*, in regard of the *Inequalities*, that fall out in the *Periods* of the *Tides*, which are commonly obſerved and believed to follow certain *Poſitions* of the *Moon* in regard of the *Equinox*, which are known not to keep a *preciſe* and *conſtant* Courſe: ſo that, there not intervening equal portions of Time between one New Moon and another, the Moons return to the ſame *Meridian*, cannot be alwaies perform'd in the ſame Time; and conſequently there muſt be a like Variation of the Tides in the Velocity, and in the Riſings and Fallings of the Tides, as to equal ſpaces of time. And the Tides from New-moon to New-moon being not alwaies the ſame in number, as ſometimes but 57, ſometimes 58, and ſometimes 59, (without any certain order of ſucceſſion) is another evidence of the difficulty of reducing this to any great exactneſs. Yet, becauſe 'tis worth while, to learn as much of it, as may be, the *Propoſer* and many others do deſire, That Obſervations be conſtantly made of all theſe Particulars for ſome Months, and, if it may be, years together. And becauſe ſuch Obſervations will be the more eaſily and exactly made, where the Tides riſe higheſt, it is preſumed, that a fit *Apparatus* being made for the purpoſe, they may be made about *Briſtol* or *Cheap-ſtow*, beſt of any places in *England*, becauſe the Tides are ſaid thereabout to riſe to ten or twelve fathoms; as upon the coaſt of *Britanny* in *France*, they do to thirteen and fourteen.

In order to which, this following *Apparatus* is propoſed to be made uſe of. In ſome convenient place upon a Wall, Rock, or Bridge, &c. let there be an *Obſervatory* ſtanding, as neer as may be to the brink of the Sea, or upon ſome wall; and if it cannot be well placed juſt where the Low water is, there may be a Channel cut from the Low water to the bottom of the Wall, Rock, &c. The Obſervatory is to be raiſed above the High-water 18. or 20. foot; and a Pump, of any reaſonable dimenſion, placed perpendicularly by the Wall, reaching above the High-water as high as conveniently may be. Upon the top of the Pump a Pulley is to be faſtned, for letting down into the Pump a piece of floating wood, which, as the water comes in, may riſe and fall with it. And becauſe the riſing and falling of the water amounts to 60. or 70. foot, the Counterpoiſe of the weight, that goes into the Pump, is to hang upon as many Pulleys, as may ſerve to make it riſe & fall within the ſpace, by which the height of the Pump exceeds the height of the Water. And becauſe by this means the Counterpoiſe will riſe and fall ſlower, and conſequently by leſs proportions, than the weight it ſelf, the firſt Pulley may have upon it a Wheele or two, to turn *Indexes* at any proportion required, ſo as to give the minute parts of the motion, and degrees of riſings and fallings. All which is to be obſerved by *Pendulum-Watches*, that have *Minutes* and *Seconds*, with *Cheeks*, according to Mr. *Hugens's* way.

And becauſe if the Hole, by which the water is let into the Pump, be as large as the Bore of the Pump it ſelf, the weight that is raiſed by the water, will riſe and fall with an Undulalation, according to the inequality of the Sea's Surface, 'twill therefore be fit, that the Hole, by which the water enters, be leſs than half as bigg as the Bore of the Pump; any inconvenience that may follow thereupon, as to the Periods and Stations of the Floud and Ebb, not being conſiderable.

And to the end, that it may appear the better, what are the *particular* Obſervations, deſired to be made, near *Briſtol* or *Cheap-ſtow* bridg, it was thought not amiſs, to ſet them down diſtinctly by themſelves.

1. The degrees of the Riſing and Falling of the water every quarter of an hour (or as often as conveniently may be) from the Periods of the Tides and Ebbs; to be obſerved night and day, for 2 or 3 months.
2. The degrees of the velocity of the Motion of the Water every quarter of an hour for ſome whole Tides together; to be obſerved by a ſecond *Pendul*-watch; and a logg faſtened to a line of ſome 50 fathoms, wound about a wheel.
3. The exact meaſures of the Heights of every utmoſt High-water and Low-water, from one Spring-tide to another, for ſome Months or rather Years.
4. The exact Heights of Spring-tides and Spring-Ebbs for ſome Years together.
5. The Poſition of the Wind at every obſervation of the Tides; and the times of its Changes; and the degrees of its Strength.
6. The State of the Weather, as to Rain, Hail, Miſt, Hazineſs, &c. and the times of its Changes.
7. At the times of obſervation of the Tides, the height of the *Thermometer*; the height of the *Baroſcope*; the height of the *Hygroſcope*; the Age of the Moon, and her *Azimuths*; and her place in all reſpects; And laſtly the *Sun*'s place; all theſe to *minutes*.

And it would be convenient, to keep *Journal Tables*, for all theſe Obſervations, each anſwering to its day of the Month.

For the *Apparatus* of all theſe obſervations, there will be particularly neceſſary.

A good *Pendulum*-watch.
A *Vane* ſhewing *Azimuths* to minute parts.
An *Inſtrument* to meaſure the ſtrength of the Winde.
A large and good *needle* ſhewing *Azimuths* to degrees.

Thermometers, *Barometers*, *Hygroſcopes.*

Theſe Obſervations being thought very conſiderable as well as curious, 'tis hoped, that thoſe who have conveniency, will give encouragement and aſſiſtance for the making of them; and withall oblige the publick by imparting, what they ſhall have obſerved of this kind: The *Publiſher* intending, that when ever ſuch obſervations ſhall be communicated to him, he will give notice of it to the *publick*, and take care of the improvement thereof to the beſt uſe and advantage. A *Pattern* of the *Table*, propoſed to be made for obſerving the *Tides*, is intended to be publiſhed the next opportunity, God permitting.

An Account
Of ſeveral Books lately publiſhed.

I. *Johannis Hevelii* DESCRIPTIO COMETÆ, *Anno Æra Chriſtianæ* MDCLXV. *exorti; unà cum* MANTISSA *Prodromi Cometici, Obſervationes omnes prioris* COMETÆ MDCLIV, *ex iiſque genuinum motum accuratè deductum, cum Notis & Animadverſionibus, exhibens.*

This Book (as the Title it ſelf intimates) undertakes two things. *Firſt*, To give an Account of the *Second* of the two late Comets, which appeared, when the *other* was ſcarce exſtinct; Concerning which, the Author doth, from the Obſervations made by himſelf with a *Sextant* of 6 foot, and divided into *minutes* and *ſeconds*, aſſign *both* its true place (as well in reſpect of the *Ecliptick* as the *Æquator*) *and* its proper motion: Adding a fair Delineation of its Courſe, together with the genuine Repreſentations of its *Head* and *Train*, in each day of its apparition; and ſubjoyning a General Deſcription and Diſcourſe of ſome of the more notable *Phenomena* thereof. It was firſt ſeen at *Dantzick* by the Watchmen, the 5th of *April* ſt. n. 1665. and then obſerved by the *Author*, from *April* 6. about $1\frac{1}{2}$ of the Clock in the morning, till *April* 20. at 3. in the morning. During which time, it went with a reaſonable velocity; making 46 deg. in its Orb, *according to the Order of the Signs*, moving from the *Breaſt* of *Pegaſus*, towards the *Head* of *Andromeda*, and the *Left Horn* of *Aries*; having, as 'tis preſumed, taken its riſe from above *Sagittary*, and run through the *Breaſt* of *Antinous*, under *Aquila*, and the *Dolphin*, to the ſaid *Pegaſus*; and ſo on, as is already expreſſed.

The *Head* of it is in the Book deſcribed of a Colour like that of *Jupiter*, all along much brighter than that of the former Comet, though of a ſomewhat leſs magnitude; having in its middle onely *one* round, but very bright and big *Kernel* or Speck, reſplendent like Gold, and encompaſſed with another more dilute and ſeemingly uniform matter: its *Tail* being at firſt, about 17 deg. and afterwards 20. and ſometimes 25 deg. long, and divaricated towards the End.

Next, it is obſerved, that though this Star did afterwards ſlacken its pace, yet it retained the vividneſs of its Colour, both of the *Head* and *Train*; the *Head* eſpecially, keeping at the time as well of the laſt obſervations, as of the

firſt